

# NEW RECORD OF *TRICHOSPILUS DIATRAEAE* MARGABANDHU & CHERIAN, 1942 (HYMENOPTERA: EULOPHIDAE) PARASITIZING *SARSINA VIOLASCENS* (HERRICH-SCHAEFFER, 1856) (LEPIDOPTERA: LYMANTRIIDAE) IN BRAZIL

Bruno Zaché\*, Ronelza Rodrigues da Costa Zaché, Natália Medeiros de Souza, Thaise Karla Ribeiro Dias, Carlos Frederico Wilcken

São Paulo State University (UNESP)  
Faculty of Agronomic Sciences, Department of Plant Production  
PO Box 237, zip code 18603-970, Botucatu, SP, Brazil

Received: October 4, 2010

Accepted: August 1, 2011

**Abstract:** This is the first report of *Trichospilus diatraeae* (Hymenoptera: Eulophidae) found in the field, parasitizing pupae of the eucalyptus defoliating *Sarsina violascens* (Herrich-Schaeffer, 1856) (Lepidoptera: Lymantriidae) in Brazil. This offers a new perspectives for the use of this parasitoid in biological control programs against caterpillars of forestry importance.

**Key words:** biological control, pupal parasitoid, forest pests, Lepdoptera defoliator

## INTRODUCTION

*Trichospilus diatraeae* is a gregarious pupal parasitoid that preferentially attacks insects in the order Lepidoptera (Bouček 1976). It has been recorded as a parasitoid of the families Crambidae (Cherian and Margabandhu 1942), Noctuidae (Etienne and Viette 1973), Pyralidae, (Etienne and Viette 1973; Bouček 1976; Bennett *et al.* 1987), Nymphalidae (Bouček 1976), Geometridae (Bennett *et al.* 1987), Pieridae (Torres-Bauza 1994), Arctiidae (Paron and Berti-Filho 2000), and Oecophoridae (Oliveira *et al.* 2005).

*Trichospilus* Ferriere, 1930 is a small genus in the tribe Eulophini (Hymenoptera: Eulophidae) with eight described species (Ferriere 1930; Cherian and Margabandhu 1942; Bouček 1976; Ubaidillah 2006; Noyes 2003). Of the eight species in this genus, three [*Trichospilus boops* (Bouček 1976); *Trichospilus ferrierei* (Bouček 1976); *Trichospilus vorax* (Bouček 1976)] were found in Africa, while *Trichospilus lutelineatus* (Liao 1987) was found only in Zhejiang, China (Liao *et al.* 1987; Zhu *et al.* 2000, 2002). *T. striatus* (Ubaidillah 2006) and *T. politus* (Ubaidillah 2006) were described from Java and Sulawesi, Indonesia (Ubaidillah 2006). *T. pupivorus* (Ferriere 1930) and *T. diatraeae* (Cherian and Margabandhu 1942) occur in tropical and subtropical areas (Noyes 2003) and have been studied as potential biological control agents against sugarcane, corn, and cotton pests in several countries of Africa, Asia and the Americas (Bouček 1976).

Defoliating caterpillars are the second most important group of pests on eucalyptus plantations in Brazil,

only falling behind the first place, leaf-cutting ants. In the past decade new species of eucalyptus defoliating lepidopterans have appeared in Brazil. *Sarsina violascens*, also known as the purple moth is a defoliating caterpillar native to Argentina and Brazil, belonging to the Order Lepidoptera, Family Lymantriidae (FAO 2008; Zanuncio and Lima 1975). It is known that this pest causes damage to the larval stage (caterpillar defoliating). *S. violascens* presents a risk to human health, because it is a stinging caterpillar (Gallo *et al.* 2002).

The attacks of defoliating caterpillars cause partial or total defoliation in plants. In the case of eucalyptus, the caterpillars interfere with the rate and balance of internal physiological processes of plants, affecting growth and formation of the biomass of the trunk. (Espindola and Gonçalves 2000).

## MATERIALS AND METHODS

Parasitoids used in this test were collected on pupae of *Iridopsis* sp. (Lepidoptera: Geometridae) in Curvelo, the state of Minas Gerais, Brazil. The *S. violascens* pupae was reared under room conditions on "urograndis" plants (*Eucalyptus urophylla* x *Eucalyptus grandis*) in the experiment area of the Forest Pest Biological Control Laboratory, University Estadual Paulista Julio Mesquita Filho, in Botucatu, São Paulo State, Brazil.

Pupae obtained from that rearing were placed in plastic containers and maintained at 26±2°C, relative humid-

\*Corresponding address:  
bzache@bol.com.br

ity 60±10%, and a 12-hour photophase. Upon pupation, 15 pupae were offered to *T. diatraeae* females in a 27:1 (parasitoid:host) ratio for 72 h. Zaché *et al.* (2010a) described the parasitoid rearing technique in detail.

Thereafter, the females were removed, and containers with *S. violascens* pupae were maintained in a climatic chamber at 26±2°C, 60±10% relative humidity and a 12 h photophase. The following parameters were determined: level of parasitism, number of emerged and not emerged parasitoids and duration of the egg-adult cycle. The pupae of *S. violascens* were dissected to evaluate the non-emerged parasitoids.

## RESULTS AND DISCUSSION

The level of parasitism reached 100%, with an emergence rate of 93.3%. A mean of 113.7 (±0.29 SE) parasitoids per pupa emerged, while only 0.7 (±0.14 SE) of parasitoids per pupa did not emerge. The *T. diatraeae* egg-adult cycle was 25.7 (±0.8 SE) days in *S. violascens* pupae. These results demonstrate for the first time, under controlled conditions, the ability of *T. diatraeae* to parasitize the pupae of *S. violascens*, a species of the Lymantriidae family (Fig. 1).

In Brazil, the introduction of *T. diatraeae* is believed to have been accidental, and its first occurrence was recorded in 1996 on pupae of Arctiidae (Lepidoptera) in Piracicaba, São Paulo State (Paron and Berti-Filho 2000). The parasitoid was reported on the pupae of *Cerconota anonella* (Sepp) (Lepidoptera: Oecophoridae) in soursop *Annona muricata* L. (Annonaceae) plantations in Planaltina, Distrito Federal (Brazil) (Oliveira *et al.* 2005). With regard to lepidopteran forest pests in Brazil, *T. diatraeae* was collected from a pupa of *T. arnobia* on eucalyptus in Minas Gerais State (Pereira *et al.* 2008). In 2010, parasitism of *T. diatraeae* was reported in a pupa of the eucalyptus defoliating looper *Melanolophia consimilaria* (Walker) (Lepidoptera: Geometridae) a pest that pupates in the soil and *Hypsipyla grandella* family Pyralidae pest of *Swietenia macrophylla* (Zaché *et al.* 2010a; Zaché *et al.* 2010b). In 2011, the occurrence in *Euselasia eucerus*, a species of the Riodinidae was described (Zaché *et al.* 2011).

More studies are needed to determine the potential of *T. diatraeae* for the biological control of lepidopteran pests in Brazilian eucalyptus plantations. The biocontrol agent *T. diatraeae* could possibly reduce the use of chemical and biological insecticides for pest control in eucalyptus.



Fig. 1. *T. diatraeae* female parasitizing a *S. violascens* pupa (A); parasitoid emergence hole (B)

## REFERENCES

- Bennett F.D., Glenn H., Yaseen M., Baranowski R.M. 1987. Records of *Trichospilus diatraeae*, an Asian parasite (Hymenoptera: Eulophidae) from the Caribbean and Florida. *Florida Entomol.* 70 (1): 184–186.
- Bouček Z. 1976. The African and Asiatic species of *Trichospilus* and *Cotterellia* (Hymenoptera: Eulophidae). *Bull. Entomol. Res.* 65 (4): 669–681.
- Cherian M.C., Margabandhu V. 1942. A new species of *Trichospilus* (Hymenoptera: Chalcidoidea) from South India. *Indian J. Entomol.* 4: 101–102.
- Espindola C.B., Gonçalves L. 2000. *Biologia de Oxydia vesulia* (Cramer, 1779) (Lepidoptera: Geometridae). *Floresta e Ambiente* 7 (1): 80–87.
- Ètienne J., Viette P. 1973. Nouvelle note sur *Polydesma umbricola* Boisduval (Lepidoptera: Noctuidae). *Bull. de la Société Entomologique de France* 78: 98–107.
- FAO. 2008. Overview of Forest Pests – Argentina. Forestry Department – Food and Agriculture Organization of the United Nations, 22 pp.
- Ferriere C. 1930. Notes on Asiatic Chalcidoidea. *Bull. Entomol. Res.* 21 (3): 353–360.
- Gallo D., Nakano O., Silveira Neto S., Carvalho R.P.L., Baptista G.C., De Berti Filho E., Parra J.R.P., Zucchi R.A., Alves S.B., Vendramim J.D., Marchini L.C., Lopes J.R.L., Omoto C. 2002. *Entomologia Agrícola*, Piracicaba: FEALQ, 920 pp.
- Liao D.X., Li X.L., Pang X.F., Chen T.L. 1987. Hymenoptera: Chalcidoidea, Economic Insect Fauna of China. No. 34. Beijing, China: Taiwan Agricultural Research Institute, 241 pp.
- Noyes J. 2003. Universal Chalcidoidea Database. Disponível em: <http://www.nhm.ac.uk/research-curation/projects/chalcidoidea>. Acesso em: 20 out. 2009.
- Oliveira H.N., Zanuncio J.C., Pedruzzi E.P., Espindola M.C. 2005. Rearing of *Thyrinteina arnobia* (Lepidoptera: Geome-

- tridae) on guava and eucalyptus in laboratory. Braz. Arch. Biol. Technol. 48 (5): 801–806.
- Paron M.R., Berti-Filho E. 2000. Capacidade reprodutiva de *Trichospilus diatraeae* (Hymenoptera: Eulophidae) em pupas de diferentes hospedeiros (Lepidoptera). Sci. Agric. 57 (2): 355–358.
- Pereira F.F., Zanuncio J.C., Tavares M.T., Pastori P.L., Jacques G.C. 2008. Record of *Trichospilus diatraeae* (Hymenoptera: Eulophidae) as parasitoid of the eucalypt defoliator *Thyrinteina arnobia* (Lepidoptera: Geometridae) in Brazil. Phytoparasitica 36 (4): 304–306.
- Torres-Bauza J.A. 1994. Hymenopterous parasitoids of *Dismorfia spio* (Pieridae: Dismorphiinae). J. Lepidopterist's Soc. 48, p. 266.
- Ubaidillah R. 2006. Eulophine parasitoids of the genus *Trichospilus* in Indonesia, with the description of two new species (Hymenoptera: Eulophidae). Entomol. Sci. 9: 217–222.
- Zaché B., Wilcken C.F., Dacosta R.R., Soliman E.P. 2010a. *Trichospilus diatraeae* Cherian & Margabandhu, 1942 (Hymenoptera: Eulophidae), a new parasitoid of *Melanolophia consimilaria* (Lepidoptera: Geometridae). Phytoparasitica 38: 355–357.
- Zaché B., Wilcken C.F., Zaché R.R.C., Soliman E.P., San Roman M.L.L. 2010b. *Trichospilus diatraeae* Cherian & Margabandhu, 1942 (Hymenoptera: Eulophidae), un nuevo parasitoid de *Hypsipyla grandella* (Zeller, 1848) (Lepidoptera: Pyralidae). Idesia (Arica. Impresa) 28 (3): 111–114.
- Zaché B., Zaché R.R.C., Soliman E.P., Wilcken C.F. 2011. Evaluation of *Trichospilus diatraeae* (Hymenoptera: Eulophidae) as parasitoid of the eucalyptus defoliator *Euselasia eucerus* (Lepidoptera: Riodinidae). Int. J. Tropical Insect Sci. 31 (1–2): 181–121.
- Zanuncio J.C., Lima J.O.G. de. 1975. Ocorrência de *Sarsina violascens* (Herrich-Schaeffer, 1856) (Lepidoptera: Lymantriidae) em eucaliptos de Minas Gerais. Brasil. Florestal 6 (23): 48–50.
- Zhu C.D., LaSalle J., Huang D.W. 2000. A review of the Chinese *Diglyphus* Walker (Hymenoptera: Eulophidae). Oriental Insects 34: 263–288.
- Zhu C.D., LaSalle J., Huang D.W. 2002. A study of Chinese *Cirropsilus* Westwood (Hymenoptera: Eulophidae). Zool. Studies 41: 23–46.